

WHAT IS CLAIMED IS:

1. An electron beam lithography apparatus including an electron optical lens-barrel having an electron lens for converging an electron beam and a deflector for deflecting the electron beam, a sample chamber for holding a sample to be subjected to lithography in a vacuum state, and a sample stage on which the sample is placed, comprising:

10 a magnetic constraint structure for constraining a posture of the sample stage using a magnetic force;

a first leakage magnetic field shield for shielding a leakage magnetic field from said magnetic constraint structure to an internal space in the sample chamber; and

15 a second leakage magnetic field shield for shielding a leakage magnetic field from the electron optical lens-barrel to the internal space in the sample chamber.

2. The apparatus according to claim 1, wherein said 20 magnetic constraint structure constrains the posture of the sample stage using a magnetic force generated by a permanent magnet.

3. An electron beam lithography apparatus including an electron optical lens-barrel having an electron lens 25 for converging an electron beam and a deflector for deflecting the electron beam, a sample chamber for

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holding a sample to be subjected to lithography in a vacuum state, and a sample stage on which the sample is placed, comprising:

an electromagnetic driver for electromagnetically driving the sample stage; and

a first leakage magnetic field shield for shielding a leakage magnetic field from said electromagnetic driver to an internal space in the sample chamber.

4. The apparatus according to claim 3, further comprising a second leakage magnetic field shield for shielding a leakage magnetic field from the electron optical lens-barrel to the internal space in the sample chamber.

5. The apparatus according to claim 3, wherein said first leakage magnetic field shield comprises a fixed magnetic field shield member; said electromagnetic driver comprises a plurality of permanent magnets fixed inside said magnetic field shield member while being aligned in a driving direction of the sample stage, and a movable driving coil opposing said permanent magnets; and the sample stage is coupled to said driving coil and driven by energizing said driving coil to drive said driving coil.

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6. The apparatus according to claim 3, wherein
said first leakage magnetic field shield
comprises a movable magnetic field shield member;
said electromagnetic driver comprises
5 a permanent magnet fixed to said magnetic field
shield member, and

a plurality of driving coils fixed while opposing
said permanent magnet and aligned in a driving
direction of the sample stage; and

10 the sample stage is coupled to said magnetic
field shield member and permanent magnet and driven by
energizing, of said plurality of driving coils, driving
coils located inside said magnetic field shield member
to drive said permanent magnet and said magnetic field
15 shield member.

7. A stage used in an electron beam lithography
apparatus, comprising:

a sample stage on which a sample is placed;
a magnetic force generator for applying a
20 pre-load to said sample stage; and

a leakage magnetic field shield for shielding a
leakage magnetic field from said magnetic force
generator.

8. The stage according to claim 7, wherein said
25 sample stage is supported to float on a surface plate
by air.

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9. The stage according to claim 7, wherein said leakage magnetic field shield is provided outside said magnetic force generator.

10. The stage according to claim 7, wherein letting
5 t1 be a distance between said magnetic force generator and the surface plate, and t2 be a distance between said leakage magnetic field shield and the surface plate, a relationship $t1 > t2$ is satisfied.

11. An electron beam lithography method using an
10 electron beam lithography apparatus comprising an electron optical lens-barrel having an electron lens for converging an electron beam and a deflector for deflecting the electron beam, a surface plate, a sample stage movable on the surface plate, a magnetic force
15 generator for applying a pre-load to the sample stage, and a leakage magnetic field shield for shielding a leakage magnetic field from the magnetic force generator, comprising the steps of:

20 placing a sample on the sample stage; and
directly drawing a pattern on the sample using the electron beam.

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